

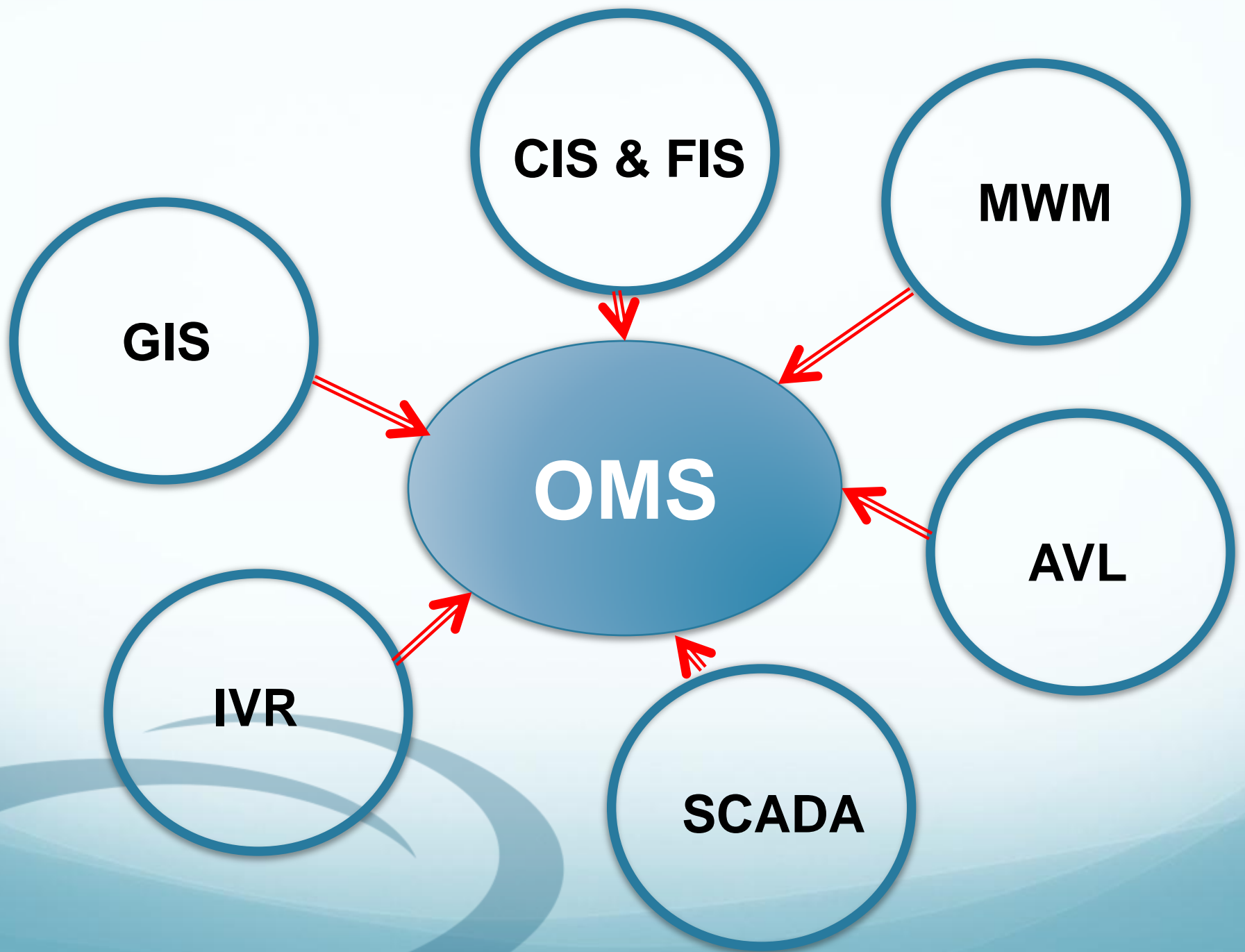
Second informational Smart Grid Meeting

April 19, 2012

**Otter Tail Power Company's
Interruption Monitoring System**

Interruption Monitoring System IMS





Original IMS Requirements

- **Low Cost**
- Easy installation and maintenance
- **Economical and reliable** communications method
- Supportable system that avoids technical obsolescence over it's useful life
- Data
 - Operational optimization
 - Historic analysis
- System **expansion capabilities** to grow with Otter Tail Power

TVM Pricing

- TVM-1 \$900
 - \$15 activation fee
 - \$74 data fee
 - **.50 per customer per year**
- TVM-3 \$1200
 - \$15 activation fee
 - \$74 data fee

Two Objectives:

- **Primary Objective:** Provide interruption data to be used to make operational decisions and prioritize future maintenance and capital upgrades.
- **Secondary Objective:** Provide accurate data used in the calculations of performance reliability indices as required by regulatory entities



System Overview

Otter Tail Power Company measures reliability at the feeder level



Pictures and charts

How it Works...

- **Sensus provides** end to end solution comprised of **three main elements**:
 - Intelligent field devices
 - Commercial cellular data service and network management
 - PowerVista™ software applications

Solution overview diagram

Wireless Communication Link

- **communications based on commercial cellular networks**
 - **General Packet Radio Service (GPRS) technology** on the AT&T nationwide GSM network (including roaming partners)
 - **1XRTT** packet data technology on CDMA networks through Aeris.net.

IMS System Capabilities

- Reliability Reporting:
 - SAIDI, SAIFI, CAIDI, MAIFI, etc.
- User Notification – event based action
- Power Quality Analysis
- IMS Mapping Tool



Graphs and charts

User Notifications

- 77 separate event based actions
- Over 120 individual recipients, including 15 distribution groups
 - Customer service centers
 - Operational maintenance folks
 - Manufacturing customers
 - Institutional customers
- Email, wireless text messaging.



Power Quality Analysis

- The IMS reports type II and III power quality events based on the ITIC (CBEMA) voltage acceptability curve
- over/under voltage monitoring **ALARMS**
 - Three under
 - Two over
- Otter Tail Power Company utilizes TVM-3 voltage monitors for PQ Analysis.

IMS Mapping Tool

- **Implemented winter 2008/2009**
 - **Developed by Telemetric–Sensus Technical Team**
 - **Prompted by customer service and operational folks in the field....**
- 

IMS table, map demo

IMS Mapping Tool

- Telemetric-Sensus came up with idea of integrating data onto Google Maps
- All functionality of Google Maps
 - Zoom, pan, search, etc
 - Map view, satellite view, hybrid
- Has provided tremendous reliability awareness to all levels of the organization.
- Graphical mapping interface has greatly improved interruption response times from CSR's

IMS Mapping Tool

http://tools.sensus.com/IMS/default.aspx?id=56 - Microsoft Internet Explorer provided by Otter Tail Power Company

http://tools.sensus.com/IMS/default.aspx?id=56

File Edit View Favorites Tools Help

Downloading the latest applications

http://tools.sensus.com/I... Tower Garden by Juice Plus+ So, You Still Think It's a Pyra...

Page Tools

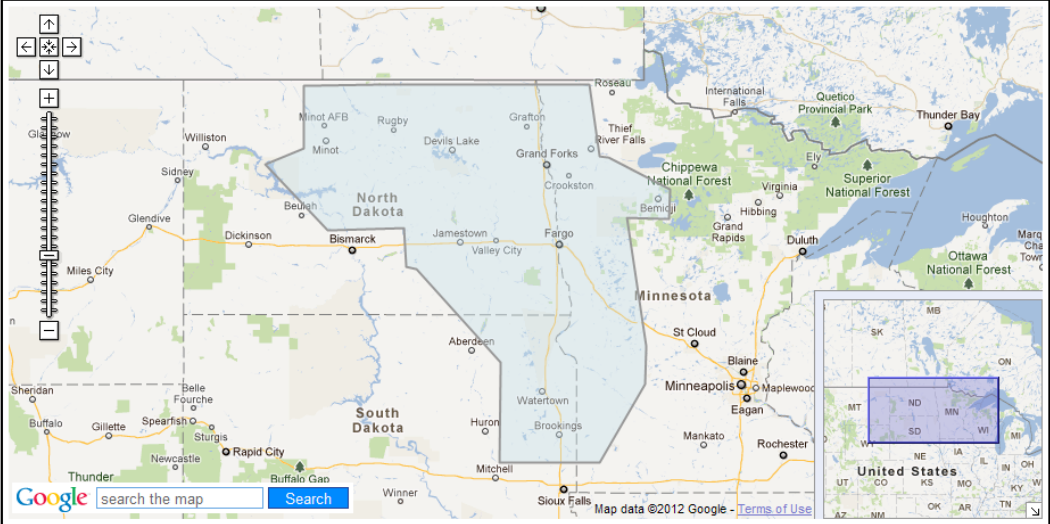
OTTER TAIL POWER COMPANY Current Outages

- ★ Recently restored outage of 5 minutes or less
- Recently restored outage of more than 5 minutes
- ▲ Current outage

Show me outages within the last hours.

[Report an outage](#)

This page will refresh every 10 minutes



Google search the map Search Map data ©2012 Google - Terms of Use

This map shows outages at feeders or distribution substations only. A feeder may feed power to many customers. Your outage may not be shown on this map. Otter Tail Power Company can't guarantee information accuracy at all times.

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sensus
The Measure of the Future

www.otpc.com

Error on page.

Internet 100%

start AddBelcourt.xl... 2 Microsoft O... 2 Internet Ex... 3 Microsoft O... C:\Documents ... 10:33 AM

Demo...

<https://powervista.sensus.com/login/>